Aquila Comments for "Under 2 MW Interconnection and Net Metering for Renewables What Utility Decision-Makers Need to Know"

Sponsors

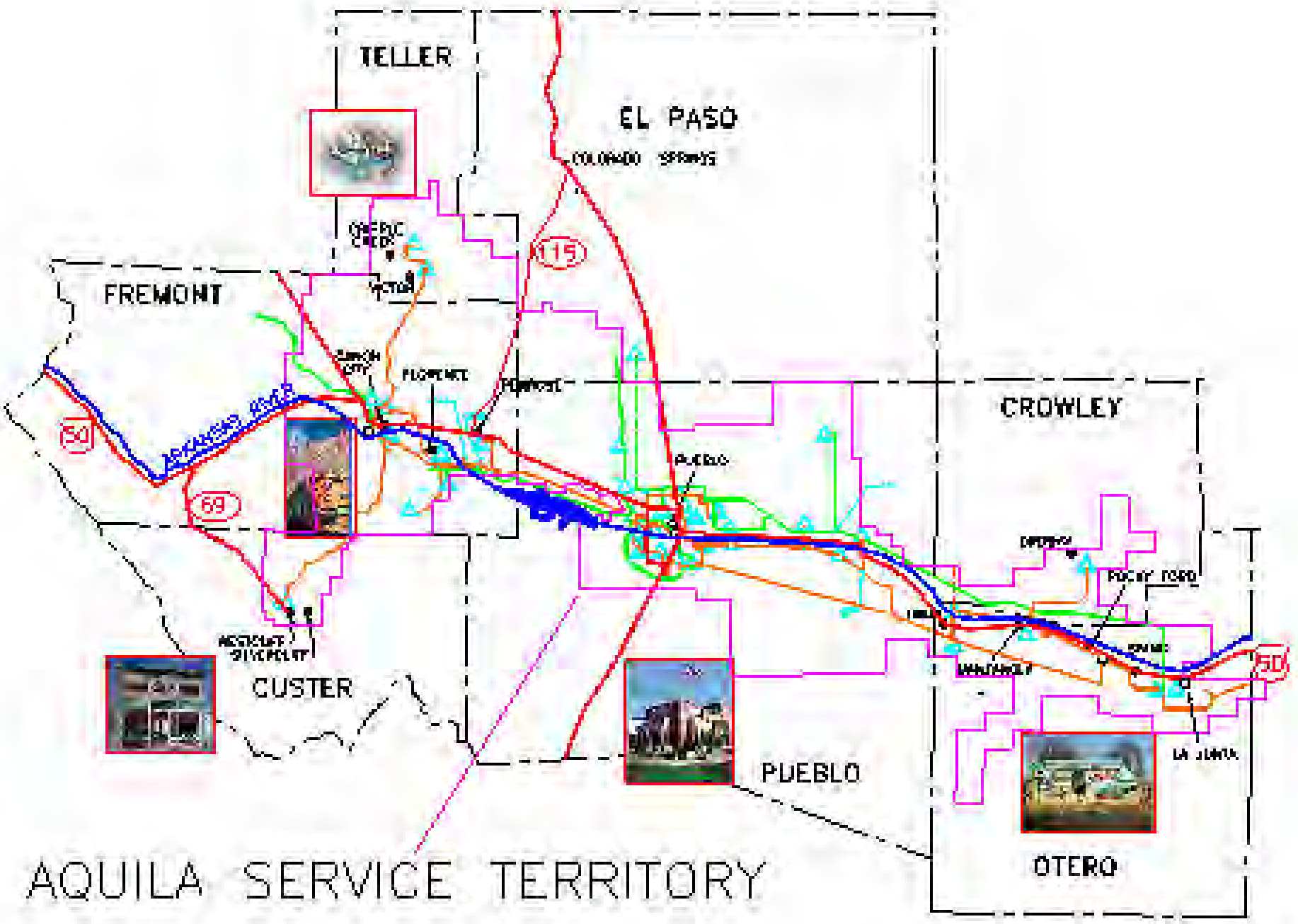
Colorado Energy Science Center
Colorado Office of Energy Management and Conservation
Colorado Renewable Energy Society
Interstate Renewable Energy Council
SolarBound
Solar Electric Power Association
U.S. Department of Energy Solar Powers America
Western Area Power Administration

Outline

- About Aquila
- Current Practices
- Current Tariffs
- A-37 Rebate Programs
- Central Solar, REC's, and other Renewables
- Interconnect Standards
- Net Metering

About Aquila

- Electric & Gas Utility Serving Areas in 7 States with Headquarters in KC Missouri
- 93,000 Electric Meters in Southern Colorado
- Colorado Electric Service Territory:
  - Along Arkansas River from the Royal Gorge to La Junta
  - Includes Cripple Creek, Victor, Westcliffe


TELLER
EL PASO
FREMONT
CROWLEY
CUSTER
PUEBLO
OTERO
115
50
69
AQUILA SERVICE TERRITORY

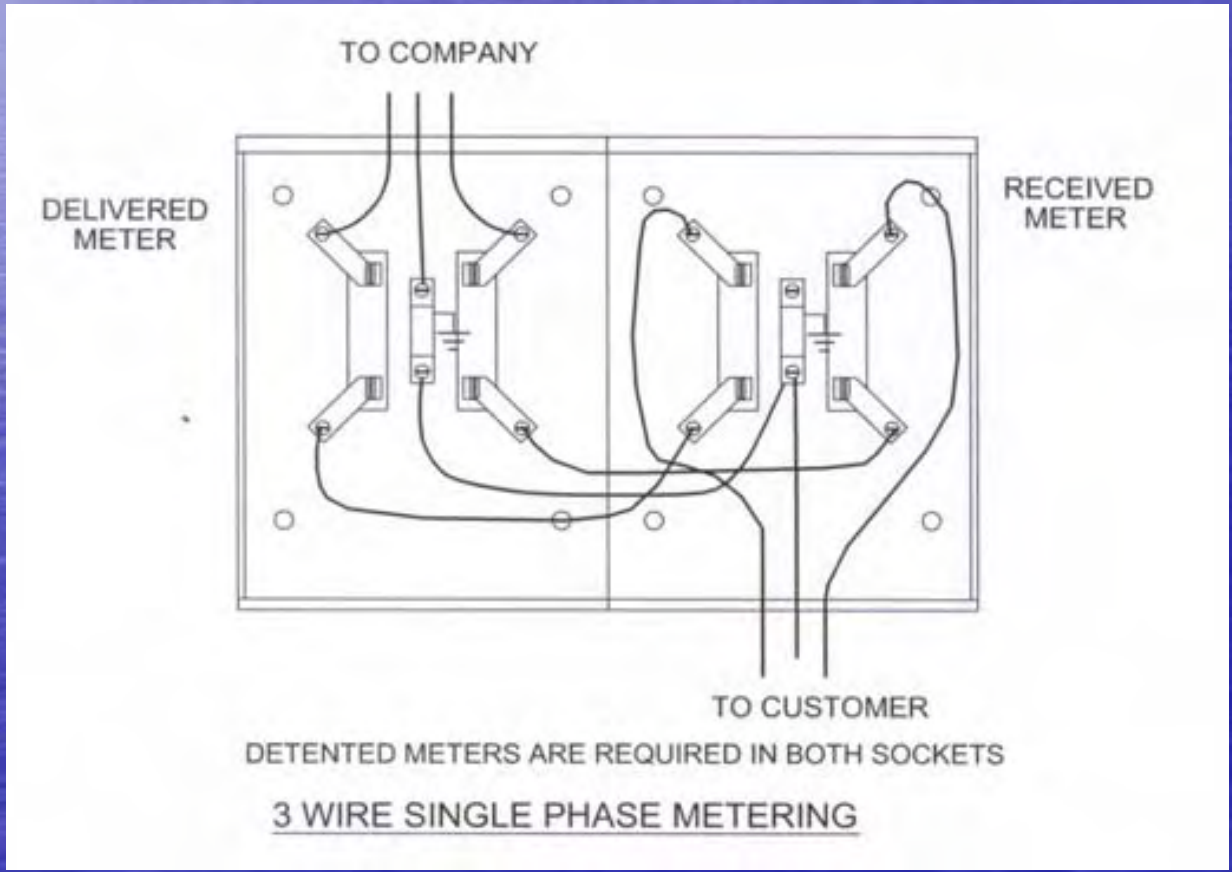
Current Practices

- Aquila Operations Standard
- Co-Gen less than 100 KW Tariff
- Dual Meters – In & Out on Service Entrance

Current Rate < 100 KW

- Modified “Net Metering”
- Full retail rate credit for (real time) displacement of load
- Avoided cost for energy pushed back to Aquila

Existing Aquila 1 Phase Metering



Aquila's A-37 Requirements

- 2004 = 344 MW
- 2004 = 1,735,000 MWH
- 10% = 174,000 MWH ~ 34 MW of Renewables
- 4% of 10% ~ 7,000 MWH
- ½ of 4% = 3,500 MWH of On-Site Solar
- 3,500 MWH ~ 1,800 KW DC of On-Site Solar
- 1,800 KW = 360 Homes @ 5KW/Home
- 40 Homes/year until 2015

Aquila's A-37 Requirements

- Aquila's 2004 Revenue = $129,000,000
- Aquila "1% Rate Cap" = $1,290,000 per year
- Reasonable administrative costs
  - Startup Costs
  - Costs < 10% Going Forward

Amendment 37 Rebate Program <10 KW On-Site Solar

- Under Construction
- Standard Rebate of $2 per watt DC per PVWATTS Calculation
- Declining Block Incentives for SO-REC's
  - First Come –First Serve Buckets
  - Existing PV Sites

Amendment 37 Rebate Program
10 KW < On-Site Solar < 100 KW

- Under Construction
- Standard Rebate of $2 per watt DC per PVWATTS Calculation
- Annual SO-REC Payments Based on Actual Generation
  - 2nd Dedicated Generator Output Meter
  - Net Meter on Main Service Entrance

Central Solar, REC's & the other ½ of 4% of 10% Solar Renewables

- Get as Much as We Can From On-Site
- Wise Use of Rate Cap $'s
- RFP for Central Solar
  - Sites with Output > Service Entrance
  - Off-system S-REC's
  - Stand Alone Projects

10 % Renewables – Non-Solar Components

- Impacts available funding for solar based on least cost criteria
- Aquila is “good” through 2012 Based on Existing Power Supply Contract
- There has been some local interest in u-Turbine wind.

Aquila Customer Environment

- Voted Against A-37
- Lower Income Levels
- Very Mobile Population in Certain Service Areas

The Aquila Distribution Enviroment

- Multiple, automatic circuit reclosing
- 4 Wire, grounded wye primary distribution
- Overvoltage protection at the primary voltage level only
- ANSI voltage ranges with automatic regulation
  - LTC's
  - Line Regulators
  - Switched Capacitors
- IEEE 519, CEBMA, etc.
- Live line work is the norm
- Illegal parallel generators, flicker, harmonics, etc.

Feeder Penetration

- Not generally an issue with some exceptions
  - When significant parallel generation is already in place from other programs – Capacity Buy Back
  - Very lightly loaded, long rural segments with diverse generation

Aquila
Amendment 37 Interconnect Standards <10 KW On-Site Solar

- Level 1 Screen
- 500 watts < Inverter Output < 10 KW
- Certified Equipment
- Feeder Penetration Limits of 15%
- Fault Current Limits
- Overload or Unbalance of Secondary
- Basically – No Utility Upgrade Required

Aquila Amendment 37 Interconnect Standards

10 KW < On-Site Solar < 2,000 KW

- Level 2 Screen
- Level 2 Study if Level 2 Screen Passes
- Level 3 Study if Level 2 Screen Fails

Service Entrance Specification Less than 10KW

- Single Meter Location
  - Typical 200 Amp 120/240 Volt Self Contained Meter Socket by Aquila installed by Customer
  - Typical 200 Amp 120/240 Volt Self Contained Electronic Meter with Net Delivered (forward)Register and Net Generated (backward) Register
- Safety Disconnect near Meter Location
  - Readily Accessible
  - Provides visible generator Disconnect
  - Lockable by Aquila technicians
  - Does not serve as overcurrent protection device
- Electrical Permits – Regional & State Inspectors
- Testing

Service Entrance Specification 10kw<Generator<50 KW

- Dual Metering – Main Service Entrance & Generator (Inverter) Output
  - Typical 320 Amp 120/240 Volt or 120/208 Volt Self Contained Meter Socket Provided by Aquila and installed by Customer for Main Service Entrance
  - Typical 320 Amp 120/240 Volt or 120/208 Volt Electronic Meter for Main Service Entrance
    - Net Delivered Meter (forward) kwh Register
    - Net Generated (backward) kwh Register
    - Demand Register on Meter to Register Peak KW Usage
  - Typical 200 Amp 120/240 Volt or 120/208 Volt Meter Socket provide by Aquila and installed by customer for Generator Output
  - Typical 200 Amp 120/240 Volt or 120/208 Volt Electronic Meter for Generator (Inverter) Output by Aquila
    - kwh Register for Generator Output
    - Read Monthly

Service Entrance Specification 10kw<Generator<50 KW Continued

- Safety Disconnect
  - Readily Accessible near Generator Meter
  - Provides visible generator Disconnect
  - Lockable by Aquila technicians
  - Does not serve as overcurrent protection device
- Electrical Permits – Regional & State Inspectors
- Testing

Service Entrance Specification 50kw<Generator

- Dual Metering – Service Entrance and Generator Output
- Main Service Entrance Meter Location
  - Typically Instrument Rated Service with Current Transformers in Aquila Transformer or in Customer Provided CT Enclosure
  - Instrument Rated Meter Socket by Aquila installed by Customer if not on Transformer
  - Instrument Rated Electronic Meter with Net Delivered (forward) Meter kwh Register and Net Generated (backward) kwh Register
  - Demand Registers on Meter to Register Peak KW and KVAR Usage

Service Entrance Specification 50kw<Generator Continued

- Generator Output Meter
- Self Contained or Instrument Rated Socket (depends on branch circuit size) provided by Aquila and installed by Customer
- Appropriate Electronic kwh Meter for SO-RECS by Aquila
- Metering Transformers Provided by Aquila and Installed by Customer

Service Entrance Specification 50kw<Generator Continued

- Safety Disconnect Rated to Interrupt Branch Circuit
  - Readily Accessible
  - Provides visible generator Disconnect
  - Lockable by Aquila technicians
  - Does not serve as overcurrent protection device
- Additional Customer or Aquila Equipment as Required by Level 2 or Level 3 Review
- Electrical Permits – Regional & State Inspectors
- Testing

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